Marine Biotechnology

Answer Key

26/06/2021

Gujarat Biotechnology Research Centre

Marine Biotechnology (Scientist B)

This question booklet contains 28 pages

Application No: _____

Time: 2 Hours

Total Marks: 200

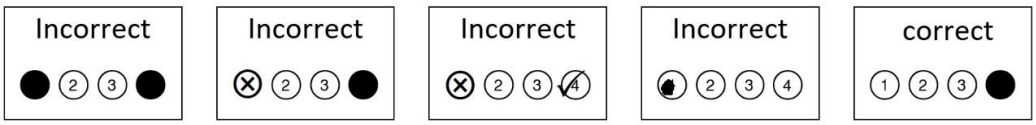
Total Questions: 200

Candidate Signature : .....

Invigilator Signature : .....

Instructions for Candidate

1. This question booklet contains 200 questions.
2. Each correct answer carries 1 mark.
3. Use only Black Ball Point Pen to darken the appropriate circle in OMR.
4. Please darken the complete circle.
5. Darken ONLY ONE CIRCLE for each Question as shown below:



6. Answer once marked cannot be changed.
7. Please do not make any stray marks on the Question Booklet.
8. Rough works must be done on the blank page of Question Booklet.
9. Mark your answer in the appropriate space in the Answer Sheet against the Number corresponding to the question.
10. The Candidate is NOT allowed to carry Question booklet and OMR response sheet with him/her on conclusion of examination.

1 EPS of biofilms consists of ____.

(A) Polysaccharides, proteins, lipids, glycoproteins, glycolipids
(B) Majorly polysaccarides and small quatitites of glycoproteins, glycolipids and extracellular DNA
(C) Majorly polysaccarides and small quatitites of proteins, glycolipids, glycoproteins and extracellular DNA
(D) Proteins, glycoproteins, glycolipids, extracellular DNA and minor quantity of polysaccharides

2 The following is true about biofilms ____.

(A) Microorganisms form >90% of the dry mass, while the matrix is <10%.
(B) Microorganisms form <50% of the dry mass, while the matrix is >50%.
(C) Matrix forms >90% of the dry mass, while the microorganisms are <10%.
(D) Microorganisms form <40% of the dry mass, while the matrix is >60%.

3 Biostimulation involves the use of ____.

(A) Stimulants to promote the multiplication and activity of intrinsic and extrinsic microbes
(B) Extraneous microbes to promote the multiplication and activity of indigenous microbes
(C) Nutrients to promote the multiplication and activity of indigenous microbes
(D) Catalysts to promote the multiplication and activity of indigenous microbes

4 Phytoremediation involves _____.

(A) Expulsion of heavy metals through membranes
(B) Storage of heavy metals on membranes
(C) Expulsion of heavy metals from vacuoles
(D) Storage of heavy metals in vacuoles

5 Great plate anomaly is _____.

(A) From 0.01 to 0.0001
(B) From 0.001 to 0.0001
(C) From 0.001 to 0.00001
(D) From 0.1 to 0.001

6 For inoculating bacteria from natural water samples, membranes of this pore size are used to filter the specimens ____.

(A) 0.45micron
(B) 0.22 micron
(C) 0.20 micron
(D) 0.02 micron

7 If the CFU in 100 microlitre of 1000x diluted inoculum is 50, then the actual number of culturable bacteria in the original sample is _____.

(A) 5x105/ml
(B) 5x106/ml
(C) 5x103/ml
(D) 5x104/ml

8 _____ is the deepest marine zone

(A) Neritic zone
(B) Littoral zone
(C) Abyssal zone
(D) Pelagic zone

9 Toxins of fungi are known as____.

(A) Mitotoxins
(B) Mycotoxins
(C) Neurotoxins
(D) Conotoxins

10 Solvent extraction is an analytical technique based on _____.

(A) Separation
(B) Adhesion
(C) Steric properties
(D) Electrostatic properties

11 Bioprospecting is _____.

(A) Exploration of biological material for commercially valuable genetic and biochemical properties
(B) Extraction of commercially valuable biochemicals from biological material
(C) Utilization of biological material for commercially valuable genetic and biochemical properties
(D) Preservation of commercially valuable biological material

12 Bryostatin, a potent modulator of protein kinase C is produced by ____.

(A) Noctiluca spp
(B) Nereis indica
(C) Bugula neritina
(D) Helichondria okadai

13 In ____ the stationary phase is held in a narrow tube and mobile phase is forced through it under pressure

(A) Liquid chromatography
(B) Gas chromatography
(C) Planar chromatography
(D) Column chromatography

14 _____ is a natural, biodegradable, nontoxic bioactive polymer widely used in food, medicine and agriculture.

(A) Fucoxanthin
(B) Chitosan
(C) Dolastatin
(D) Aplidin

15 Metagenomics is the study of ____.

(A) Metabolome derived from whole genome data
(B) Effect of gene regulation on metabolism of microbes
(C) Prediction of metabolic genes from microbial genomic data
(D) Genomic information of non culturable microbial communities

16 _____ is used to identify purified marine bioactive compounds

(A) Gas chromatography
(B) Fourier Transform Infrared Spectroscopy
(C) Thin layer chromatography
(D) Column chromatography

17 ____ is used to dessicate natural products at low temperatures

(A) Centrifugation
(B) Filtration
(C) Lyophilisation
(D) Cryo-dessication

18 The region used for DNA barcoding of metazoans is ____.

(A) 5’ region of Cyt c oxidase subunit I
(B) Coding sequence of Cyt c oxidase subunit I
(C) 3’ region of Cyt c oxidase subunit I
(D) Regulatory region of Cyt c oxidase subunit I

19 Which sequence is most closely related to the DNA sequence AGTCGTATGC?

(A) AGTCGGCGCC
(B) ATTTGTCGCC
(C) ATTCGTATGC
(D) ACAGCATACG

20 Which of the following is not a variant of BLAST?

(A) BLASTN
(B) BLASTP
(C) BLASTX
(D) TBLASTNX

21 In FASTA, for a Z-score >15, the match can be considered _____ for a homologous relationship.

(A) Insignificant
(B) Not correlated
(C) Significant
(D) Mismatched

22 16SrRNA, 12SrRNA, COI, II, III, and Cytochrome b are

(A) Mitchondrial DNA markers
(B) Nuclear DNA markers
(C) Cell markers
(D) Tissue markers

23 Which of the following is untrue regarding PSIPRED?

(A) It is a web-based program that predicts protein secondary structures
(B) It uses a combination of evolutionary information and neural networks
(C) It uses evolutionary information only
(D) The multiple sequence alignment is derived from a PSI-BLAST database search

24 Ab initio approach makes structural predictions based on _____.

(A) A single RNA sequence
(B) Comparision of RNA sequences
(C) Evolutionary basis
(D) Phylogenetics

25 Which of the following about the RNAFold is incorrect?

(A) It extends the sequence alignment to the vicinity of the optimal diagonals to calculate thermodynamic stability of alternative structures
(B) It incorporates a partition function
(C) It doesn't necessarily use a partition function
(D) It aims to select a number of statistically most probable structures in one of its steps

26 A shuttle vector designed for cloning in E. coli and expression in yeast is likely to have these elements.

(A) pMB1 ori and SV40 ori
(B) colE1 ori and F1 ori
(C) pMB1 ori and ARS
(D) colE1 ori and CMV ori

27 An antibiotic selection marker commonly used for selecting transformed eukaryotic cell lines is _____.

(A) Carbenicillin
(B) Neomycin
(C) Streptavidin
(D) Chloramphenicol

28 Which of the following is the transcription initiation site of a gene?

(A) The part of a promoter where transcription factors initially bind
(B) The part of a promoter where RNA polymerase initially binds
(C) The part of a promoter where the first ribonucleotide is added
(D) First ATG codon after the promoter

29 _____ is a method of post-transcriptional gene silencing

(A) Riboswitch
(B) Alternative splicing
(C) RNA methylation
(D) RNA interference

30 Which of these is a trans regulatory element?

(A) Transcription factor
(B) Promoter
(C) Enhancer
(D) Attenuator

31 Methylation of CpG islands _____.

(A) Enhances binding of regulatory transcription factors
(B) Prevents activation of enhancers
(C) Enhances the binding of chromatin remodeling proteins
(D) Prevents binding of RNA Pol

32 MEGA stands for _____.

(A) Molecular Epi-Genome Analysis
(B) Microbial Evolutionary Genome Analysis
(C) Microbial ecology and genetic analysis
(D) Molecular Evolutionary Genome Analysis

33 Telomeres are end sequences of linear chromosomes _____.

(A) Made by DNA polymerase
(B) Made by a special reverse transcriptase
(C) Made by terminal transferase
(D) Made by polynucleotide synthase

34 Which of the following techniques is used to identify the location of a transgene?

(A) RT-PCR
(B) Inverse PCR
(C) Gateway PCR
(D) LIC-PCR

35 Which of the following is not a feature of the genetic code?

(A) Commaless and continuous
(B) It is universal with few exceptions
(C) One codon may code for 2 or more amino acids
(D) 2 or more codons may code for 1 amino acid

36 A polyribosome is _____.

(A) The structure where small and large subunits of ribosome are assembled
(B) The structure where ribosomal RNAs are synthesized
(C) The structure where multiple ribosomes are engaged in translating an mRNA molecule
(D) The structure where mis-formed ribosomes are degraded.

37 Which of the following is a true feature of the Watson and Crick Model of DNA duplex ?

(A) Purines are equimolar with purines
(B) Pyrimidines are equimolar with pyrimidines
(C) Purines are equimolar with pyrimidines
(D) Base composition is constant across organisms

38 This DNA polymerase does not have proofreading ability.

(A) E. coli DNA polymerase
(B) Taq DNA polymerase
(C) Pfu DNA polymerase
(D) Large Klenow fragment

39 Cytochrome C sequence is used for estimating phylogenetic relationships among evolutionary distant organisms because _____.

(A) It is present in all organisms and is invariant
(B) It is present in all organisms and has low variation
(C) It is present in all organisms and is moderately variable
(D) It is present in all organisms and is very highly variable

40 Class II restriction enzymes recognize a _____.

(A) Palindromic sequence and cut at a random location within it
(B) Palindromic sequence and cut at a random location outside it.
(C) Palindromic sequence and cut at a fixed location within it
(D) Non palindromic sequence and cut at a fixed location within it

41 Which criterion is to be met to be classified as “Endangered”?

(A) 80 % reduction in population size in last 10 years
(B) < 100 km^2 area extent of occurrence
(C) < 2500 mature individuals
(D) 20 % reduction in population size over 3 generations

42 CITES stands for ____.

(A) Convention on International Trade in Endangered Species
(B) Consultation on International Trade in Endangered Species
(C) Critically Threatened and Endangered Species
(D) Convention on International Trade and Environment Sustainability

43 DNA barcoding of metazoans is based on the sequence of _____.

(A) 16S rRNA
(B) CO1 gene
(C) 6/8 ATPase gene
(D) D loop

44 Fluorescent in situ hybridization is performed on chromosomes in ____

(A) Prophase
(B) Metaphase
(C) Anaphase
(D) Telophase

45 Animal mitochondria contain genes for ____.

(A) 2 rRNAs, 22 tRNAs, 12 or 13 structural proteins
(B) 5 rRNAs, 2 tRNAs, 2 or 3 structural proteins
(C) 4 rRNAs, 10 tRNAs, 20 structural proteins
(D) 3 rRNA, 15 tRNAs, 10 structural proteins

46 Hybridoma cells used to produce ___ are made by fusing _____.

(A) moAbs; B cells and myeloma cells
(B) priAbs; B cells and myeloma cells
(C) moAbs; B cells and stem cells
(D) priAbs; B cells and macrophages

47 ___ is not expected in eukaryotic mRNA

(A) Ribosomal binding site
(B) Localization signal
(C) Poly A signal
(D) Internal ribosomal entry site

48 A suppressor tRNA can _____.

(A) Suppress translation initiation
(B) Suppress translation termination
(C) Suppress codon and insert a modified amino acid
(D) Suppress codon and insert a random amino acid

49 ____ is untrue about kelp forests.

(A) Productive ecosystems
(B) Associated with coastlines
(C) Macroscopic algal bloom
(D) Microscopic algal blooms

50 ____ is not a characteristic of algal bloom

(A) Likely to occur in areas fed by fertilizer run offs
(B) Likely to occur in areas fed by pharmaceutical effluents
(C) Block sunlight
(D) Deplete oxygen

51 The two major omega 3 fatty acids are _____

(A) Eicosahexanoic acid and docosapentaenoic acid.
(B) Eicosapentaenoic acid and docosahexaenoic acid.
(C) Eicosapentaenoic acid and dodecylhexaenoic acid.
(D) Entosapentaenoic acid and docosahexaenoic acid.

52 Marine _____ are the primary producers of _____ fatty acids like EPA, DHA

(A) microalgae; omega 3
(B) microalgae; omega 6
(C) Bivalves; omega 3
(D) Bivalves; omega 6

53 ____ is untrue about Odontella aurita.

(A) Marine diatom cultivated industrially for EPA
(B) Marine macroalga useful for bioremediation of oil spills
(C) Marine microalga cultivated industrially for EPA
(D) Found in coastal waters

54 ____ and ____ are the parent fatty acids for n3 and n6 PUFA, respectively.

(A) Linolenic acid; Alpha linoleic acid
(B) Alpha linolenic acid; Linoleic acid
(C) Linoleic acid; Alpha linolenic acid
(D) Alpha linolenic acid; Beta linoleic acid

55 Of the few algal species approved as food supplements ____ is a freshwater alga.

(A) Arthrospira
(B) Chlorella
(C) Dunaliella
(D) Odontella

56 The original species used to produce the dietary supplement Spirulina belongs to the genus _____.

(A) Arthrospira
(B) Odonspira
(C) Spiratella
(D) Dunaspira

57 The optimal range of illumination for cultivation of microalgae is between _____.

(A) 450 and 600 nm
(B) 400 and 500 nm
(C) 500 and 600 nm
(D) 600 and 700 nm

58 The process of hydrothermal liquefaction on the cyanobacterium Nostoc ellipsosporum is likely to produce ____.

(A) Biofertilizer
(B) Biodiesel
(C) Ethanol
(D) Single cell protein

59 _____ is the biofuel that can be economically produced from microalgae because it has fatty acids of _____ length.

(A) Biodiesel; C12 - C20
(B) Biopetrol; C12 - C20
(C) Biodiesel; C4 - C12
(D) Biopetrol; C4 - C12

60 Biodiesel is produced by transesterification of ____ and generates ____ as a by-product.

(A) Fatty acids; glycerol
(B) Triacylglycerols; fatty acids
(C) Triacylglycerols; glycerol
(D) Fatty acids; methanol

61 _____ is not a marine fatty fish rich in EPA and DHA.

(A) Salmon
(B) Mullet
(C) Tuna
(D) Mackerel

62 ___ best describes cyanobacteria.

(A) Blue-green autotrophic prokaryotes with no internal membranes
(B) Blue-green autotrophic microalgae that produce oxygen
(C) Blue-green autotrophic single cellular eukaryotes
(D) Blue-green autotrophic prokaryotes with internal membranes that produce oxygen

63 Green fluorescent protein has been isolated from _____, and has _____ emission wavelength.

(A) Jellyfish; 650 nm
(B) Jellyfish, corals and sea anemones; same
(C) Corals; 670 nm
(D) Jellyfish, corals and sea anemones; different

64 Red fluorescent protein is derived from _____.

(A) Jellyfish
(B) Corals
(C) Sea anemones
(D) Copepods

65 EPA can also be written as ____.

(A) C20:5 (n-6)
(B) C20:5 (n-3)
(C) C22:5 (n-3)
(D) C20:6 (n-3)

66 Codon bias has no relation with ____.

(A) Degeneracy of the genetic code
(B) Genomes use some codons more often than others
(C) The base composition of genomes of closely related species is similar
(D) Gene regulation

67 Alpha-complementation has no relation with _____.

(A) Regulation of E. coli lac operon
(B) Selection of recombinant E. coli clones
(C) Isopropylthiogalactoside
(D) Complementary DNA

68 Gene expression profiling by real time PCR does not require _____.

(A) SYBR Green
(B) Calibration curve of the sequence
(C) Internal control gene
(D) Good quality cDNA

69 If 16S rRNA primer is used to sequence environmental DNA on a NGS platform, _____ will be obtained.

(A) Novel genes for various applications
(B) Mitogenomes of environmental microbes
(C) Assessment of microbial diversity
(D) DNA barcodes of environmental microbes

70 Taq Pol can copy _____ bp in less than 10 sec at 72°C, _____ proofreading.

(A) 1000 bp; without
(B) 1000 bp; with
(C) 2000 bp; without
(D) 500 bp; with

71 Separation of proteins on SDS-PAGE is based on ____.

(A) Molecular weight, charge and shape
(B) Molecular weight and charge
(C) Molecular weight
(D) Amino acid composition and molecular weight

72 In situ hybridization is used to ____.

(A) Localize a specific RNA or DNA sequence in a Southern hybridization
(B) Localize a specific RNA or DNA sequence in a tissue
(C) To introduce site specific mutation
(D) To induce homologous recombination at a specific genomic location

73 The specificity of PCR primers cannot be increased by

(A) Keeping the length between 18 - 30 bases
(B) Avoiding internal complementarity
(C) Keeping A or T nucelotide at the 3' end
(D) Avoiding complementarity between F and R primers

74 The following is true about an expression vector with a T7 promoter.

(A) The recombinant protein can be expressed in only wild type E. coli
(B) The recombinant protein can be expressed in only lab strains of E. coli
(C) The recombinant protein can be expressed only in E. coli strains carrying T7 Pol
(D) The recombinant protein can be expressed in all E. coli strains

75 Automated Sanger's sequencing does not use ___.

(A) Dideoxy dNTPs
(B) Alpha 32P labelled dNTPs
(C) Fluorescently labelled ddNTPs
(D) Polyacrylamide separation gel

76 The maximum number of samples that can be simultaneously sequenced by automated Sanger's sequencing is _____.

(A) 96
(B) 192
(C) 282
(D) 384

77 Western blotting uses ___ technique for detecting specific proteins.

(A) Native activity of the protein
(B) ELISA
(C) RIA
(D) Hybridization

78 Nested PCR uses ____ set of primers against the same sequence to ensure ____.

(A) 2; specificity
(B) 2; longer amplicons
(C) 1; flanking sequence
(D) 2; 3' and 5' flanking sequences

79 In a phylogenetic tree all the species branching out from the same arm of the tree constitute a _____.

(A) Paraphyletic group
(B) Monophyletic group
(C) Polyphyletic group
(D) Ortho-phyletic group

80 Which of the following evolutionary models assign different rates for transitions and transversions?

(A) Kimura-2 Parameter model
(B) Jukes-Cantor model
(C) ABGD model
(D) PTP model

81 ____ is untrue about mitochondrial DNA

(A) It is maternally inherited
(B) It never recombines
(C) It has two origins of replication
(D) It has a very low rate of mutation

82 T/A cloning of PCR products is possible if ____ is used

(A) Pfu Pol
(B) Taq Pol
(C) Vent Pol
(D) UlTma

83 ___ is not an example of a high capacity vector.

(A) Bacterial Artificial Chromosome
(B) Baculovirus Artificial Chromosome
(C) P1 Artificial Chromosome
(D) Yeast Artificial Chromosome

84 The first microorganism to be patented was _____.

(A) Pseudomonas elegans
(B) Pseudomonas laboraticum
(C) Pseudomonas putida
(D) Pseudomonas crudeii

85 Who distinguished first between somatoplasm and germplasm?

(A) Charles Darwin
(B) Weismann
(C) Lamarck
(D) Bateson

86 The term 'bioaugumentation' implies introduction of ____.

(A) One strain of microorganism for degrading aromatics to smaller compounds
(B) Competent strains or consortia of microorganisms for degrading aromatics to less toxic compounds
(C) Any strain or consortia of microorganisms for degrading aromatics to harmless compounds
(D) Test strains or consortia of microorganisms for degrading aromatics to benign compounds

87 Scientist who demonstrated that x rays are mutagenic.

(A) W. Flemming
(B) Waldeyar
(C) Muller
(D) Robert Hooke

88 Movement of chromosome is associated with

(A) Spindle fibres
(B) Nucleolus
(C) Cytoplasm
(D) Cell wall

89 It contains materials for building DNA and messenger molecules which act and intermediates between nucleus and cytoplasm

(A) Cytoplasm
(B) Nucleoplasm
(C) Cell wall
(D) Nuclear membrane

90 Scientist who discovered Phytohaemagglutinin (PHA), a mitotic agent for lymphocyte culture

(A) W Flemming
(B) Morgan
(C) TC Hsu
(D) Peter C Nowell

91 The sequence of events which occur between one cell division and the next is

(A) Cytokinesis
(B) Cell cycle
(C) Karyokinesis
(D) Interphase

92 It produces two daughter cells which have the same number of chromosomes as that of parent cell

(A) Meiosis
(B) Mitosis
(C) Cytokinesis
(D) DNA synthesis

93 Zygotene is the stage of cell division that occurs prior to

(A) Pachytene
(B) Leptotene
(C) Diplotene
(D) Diakinesis

94 Cell repair in an organism is achieved by

(A) Meiosis
(B) Metaphase
(C) G1phase
(D) Mitosis

95 Meiosis II deals with _____

(A) Haploid chromosomes
(B) Diploid chromosomes
(C) Tetraploid chromosomes
(D) Triploid chromosomes

96 These are bearers of hereditary instruction and regulation of cellular processes

(A) Golgi body
(B) Chromosomes
(C) Ribosomes
(D) Lysosomes

97 Production of intracellular digestive enzymes which aid in animal cells disposal of bacteria and other foreign bodies

(A) Ribosome
(B) Lysosomes
(C) Mitochondria
(D) Centrioles

98 In this phase Formation of spindle fibres is completed and chromosomes are attached to the spindle fibres at the point of centromere

(A) Telophase
(B) Metaphase
(C) Prophase
(D) Anaphase

99 It is the longest phase of meiotic division. It has five sub stages

(A) Prophase
(B) Prophase I
(C) Metaphase II
(D) Prophase II

100 Synaptonemal complex is considered to be associated with

(A) Chromosomes pairing and recombination
(B) Chromosome migration
(C) Chromosome duplication
(D) Chromosome reduction

101 Name of fertilized fish egg is

(A) Gamete
(B) Gametophyte
(C) Spermatocyte
(D) Zygote

102 The number of chromosomes found in somatic cells is represented as

(A) 2n
(B) n
(C) 4n
(D) 3n

103 One of the two distinct longitudinal subunits of a chromosome is called

(A) Centromere
(B) Chromatid
(C) Chromomere
(D) Telomere

104 The NOR contain several copies of gene coding for

(A) ribosomal RNA
(B) cDNA
(C) gDNA
(D) siRNA

105 It is the active region of the chromosome, involved in transcription

(A) Ribosomal RNA
(B) Euchromatin
(C) Heterochromatin
(D) Centriole

106 Each nuclesome consists of linker DNA and

(A) Histone proteins
(B) Nuclear proteins
(C) Cytoplasm
(D) Cellular proteins

107 A chromosome with two identical arms and identical genes is called as

(A) Hetero chromosome
(B) Small chromosome
(C) Isochromosome
(D) B Chromosome

108 Circular shapes chromosomes are present in

(A) Bacteria
(B) Animal cell
(C) Plant cell
(D) Fish cell

109 A condition in which crossing over does not occur between two genes located on the same chromosomes is known as

(A) Absolute linkage
(B) Incomplete linkage
(C) Repulsion linkage
(D) Coupling linkage

110 Who linked linkage to crossing over and segregation of homologous chromosomes during meiosis

(A) Mendel
(B) Bateson & Punnet
(C) T. H. Morgan
(D) Bridges

111 Crossing over takes place at four strand stage during ... of Miosis I

(A) Leptotene
(B) Pachytene stage
(C) Diplotene
(D) Zygotene

112 Genetic variations are created due to

(A) Crossing over
(B) Linked genes
(C) Sister chromatids
(D) Parallel order

113 The chromosome containing genes which determine reproduction traits and involved in sex-determination of the individuals.

(A) Autosomes
(B) Sex- chromosome
(C) B chromosome
(D) Isochromosome

114 It is an intra-chromosomal aberration a part of chromosome become detached and reattached in opposite order

(A) Duplication
(B) Deletion
(C) Inversion
(D) Translocation

115 Any change in the chromosome number from the diploid condition is referred to as

(A) Heteroploidy
(B) Ploidy
(C) Disomic
(D) Trisomic

116 It is due to trisomic condition of 21^{st} chromosome and is called

(A) Turners syndrome
(B) Down's syndrome
(C) Kline felters syndrome
(D) Cri-du-chal syndrome

117 The sudden heritable change in the phenotype of an organism is called

(A) Translocation
(B) Mutation
(C) Inversion
(D) Duplication

118 If the mutation occurs due to the artificial treatment by physical or chemical mutagenic agents, the mutation is called as

(A) Point mutation
(B) Spontaneous mutation
(C) Induced mutation
(D) Reverse mutation

119 The genotoxicity caused by mutagenic agent at DNA level can be assessed by

(A) Comet assay
(B) Cytoplasmic assay
(C) Protein assay
(D) Biometric assay

120 Live and dead cell count is performed using

(A) Eosin-nigrosin staining
(B) Gimsa staining
(C) Silver staining
(D) Aceo-arsin staining

121 MTT test is performed for measuring

(A) Genotoxicity
(B) Cytotoxicity
(C) Phytology
(D) Cytology

122 Colchicine breaks

(A) Anaphase
(B) Prophase
(C) Telophase
(D) Spindle formation

123 Diploid chromosome number of C. magur is

(A) 50
(B) 54
(C) 48
(D) 56

124 Diploid chromosome number of Catla catla is

(A) 48
(B) 50
(C) 54
(D) 56

125 …… is used for treatment of chromosomes for C-banding

(A) 5% Barium Hydroxide
(B) 5% $KMNO_4$
(C) 50%silver nitrate
(D) 5% NACL

126 All organisms are experienced natural mutations which resulted with creation of

(A) Genetic polymorphism
(B) Pollution
(C) Toxicity
(D) Extinction

127 Mitochondrial genes are received from

(A) Paternal inheritance
(B) Cytoplasmic inheritance
(C) Nuclear inheritance
(D) From male

128 Molecular markers that are associated with anonymous genomic segments are called

(A) Allozymes
(B) Type II
(C) Eye-lens Proteins
(D) Isoelectric Focusing (IEF)

129 Less variable regions of conserved DNA are more suitable for

(A) Population level
(B) Family level
(C) Evolutionary analysis between species
(D) Group level

130 Which protein has been produced by generating a transgenic sheep that is used for replacement therapy for individuals at risk from emphysema?

(A) Plasminogen activator (tPA)
(B) α-anti trypsin (AAT)
(C) Casein
(D) Amyloid precursor proteins

131 Which of the following statement is true?

(A) Adenine has 4 nitrogen atoms.
(B) Cytosine has 3 nitrogen atoms.
(C) Guanosine has 3 nitrogen atoms.
(D) Uracil has 5 nitrogen atoms.

132 The most common lipids in cells are

(A) Monoglycerides
(B) Diglycerides
(C) Triglycerides
(D) Polyglycerides

133 In meiosis, recombination occurs in.

(A) Metaphase I
(B) Prophase I
(C) Metaphase II
(D) Prophase II

134 An individual having identical allele at a particular locus is said to be

(A) Homozygous
(B) heterologous
(C) homologous
(D) heterozygous

135 Recombination percentage in a diploid cannot exceed

(A) 100
(B) 50
(C) 25
(D) 75

136 Polygenic inheritance centers around:

(A) epistasis and qualitative traits
(B) additive alleles and quantitative traits
(C) multiple alleles and quantitative traits
(D) additive alleles and its qualitative traits

137 Which one of the following is an example of a dihybrid cross?

(A) AaBb x aabb
(B) AaBb x AaBb
(C) aabb x AABB
(D) aabb x aabb

138 Alleles that are both expressed in a heterozygote are

(A) completely dominant
(B) codominant
(C) incompletely dominant
(D) epistatic

139 Assuming Hardy-Weinberg equilibrium, what percentage of individuals are heterozygous if p = 0.6?

(A) 16%
(B) 24%
(C) 35%
(D) 48%

140 RFLP analysis is a technique that

(A) uses hybridization to detect specific DNA restriction fragments in genomic DNA
(B) is used to determine whether a gene is transcribed in specific cells
(C) measures the transfer frequency of genes during conjugation
(D) is used to detect genetic variation at the protein level.

141 Replication of DNA

(A) takes place in a “conservative” manner
(B) takes place in a “dispersive” manner
(C) takes place in a “semi-conservative” manner
(D) usually involves one origin of replication per chromosome in eukaryotes

142 Which of the following two hormones are essential for induced breeding of fishes?

(A) TSH and ACTH
(B) Oestrogen and progesterone
(C) FSH and LH
(D) Vassopressin and oxytocin

143 Reduction of heterozygosity in a population caused by subpopulation structure is known as.

(A) Genetic drift
(B) Demographic bottleneck
(C) Founder effect
(D) Walhund effect

144 The DNA recognition sequence for EcoRI is ---------- .

(A) GAATTC
(B) CAATTC
(C) TAATTC
(D) AAATTC

145 Integrative form of plasmids are known as –

(A) cosmids
(B) phagemids
(C) episome
(D) lambda phage

146 Higher salt concentration in hybridization buffer facilitates

(A) Stability in sugar-phosphate backbone
(B) Increase in the viscosity of the solution
(C) Stability in the viscosity of the solution
(D) Increase in ion concentration and reassociation between complementary strands

147 The mRNA population of eukaryotic cells out of total RNA is about

(A) 10%
(B) 30%
(C) 20%
(D) 1-5%

148 Aequorea victoria is famous as the source of _____.

(A) Green fluorescent protein
(B) Heat shock protein
(C) Cold shock protein
(D) Red fluorescent protein

149 What allelic frequency will generate twice as many recessive homozygotes as heterozygotes?

(A) 0.9
(B) 0.4
(C) 0.16
(D) 0.8

150 Exon skipping is associated with

(A) regulatory mutations
(B) RNA processing mutations
(C) nonsense mutations
(D) silent mutations

151 Which of the following conditions is caused by a trinucleotide (triplet)repeat expansion?

(A) Cystic fibrosis
(B) Duchenne muscular dystrophy
(C) Huntington disease
(D) Alzheimer's disease

152 A high blood ammonia level occurs in:

(A) Galactosaemia
(B) Hurler's syndrome
(C) Ornithine transcarbamylase (OTC) deficiency
(D) Phenylketonuria

153 Carriers of the colour-blindness trait include:

(A) Men who are heterozygous for the trait.
(B) Men who are homozygous for the trait.
(C) Women who are heterozygous for the trait.
(D) Women who are homozygous for the trait.

154 You have sampled a population in which you know that the percentage of the homozygous recessive genotype (aa) is 36%. The frequency of the "a" allele is

(A) 60%
(B) 36%
(C) 72%
(D) 30%

155 How many tetrads are found in meiotic prophase in an organism with a diploid number of 12?

(A) 6
(B) 12
(C) 18
(D) 24

156 Homologous chromosomes are not necessarily identical in their

(A) overall size
(B) centromere placement
(C) arm ratio
(D) alleles

157 The most common autosomal aneuploid is

(A) trisomy 13
(B) trisomy 15
(C) trisomy 18
(D) trisomy 21

158 A duplication is:

(A) an exchange between non-homologous chromosomes, resulting in chromosomes with new genes adjacent to each other.
(B) loss of genes in part of a chromosome
(C) an extra copy of the genes on part of a chromosome
(D) a reversal of order of genes on a chromosome

159 The step of 'proof reading' during protein synthesis is carried out by

(A) Ribosome
(B) m-RNA
(C) t-RNA
(D) Aminoacyl t-RNA synthetase

160 Gene frequency is

(A) Square of genotypic frequency
(B) Square root of genotypic frequency
(C) Cube root of genotypic frequency
(D) Thrice the genotypic frequency

161 What is used to restrict transgene expression?

(A) Promoter
(B) Inducer
(C) Silencer
(D) Reporter

162 The pituitary gland of which of the following fish were successfully used for induced breeding of IMC

(A) Mullets
(B) Feather backs
(C) Seabass
(D) Marine catfish

163 The full form of FBIS database is

(A) Fish Barcode information system
(B) Fish Basic information system
(C) Fish Barcode integrated system
(D) Fish Base information system

164 The genotypic ratio of a monohybrid cross is

(A) 01:02:01
(B) 03:01
(C) 02:01:01
(D) 9:3:3:1

165 The genome of a bacterium is composed of a single DNA molecule which is 100 bp long. How many moles of genomic DNA present in the bacterium?

(A) $1/6 \times 10^{-23}$
(B) $1/6 \times 10^{-24}$
(C) 6×10^{14}
(D) 6×10^{23}

166 In eukaryotic replication, helicase loading occurs at all replicators during

(A) G0 phase
(B) G1 phase
(C) S phase
(D) G2 phase

167 E. coli is being grown in a medium containing both glucose and lactose. On depletion of glucose expression of β-galactoside will:

(A) Remain unchanged
(B) Increase
(C) Decrease
(D) Initially decrease and then increase

168 Which is not a part of the nuclear bodies?

(A) P-bodies
(B) Nucleolus
(C) Cajal bodies
(D) Interchromatin granule clusters

169 During eukaryotic cell division, metaphase to anaphase transition is regulated by degradation of

(A) Cyclin B1
(B) CDK1
(C) Aurora A kinase
(D) Polo-like kinase

170 Terpenes are built up from units called _____.

(A) Pyridine
(B) Pyrrolidine
(C) Isoprene
(D) Piperidine

171 Junctions which tether cytoskeletal filaments inside the cell are known as

(A) Anchoring junctions
(B) Occluding junctions
(C) Channel forming junctions
(D) Signal-relying junctions

172 Which of the following is not a cell adhesion protein?

(A) Cadherin
(B) Selectin
(C) Immunoglobulin (Ig) superfamily
(D) Laminin

173 Pyrogram is a term related to

(A) Recombinant DNA technology
(B) Sanger sequencing technology
(C) Nanotechnology
(D) Next generation sequencing technology

174 The most useful method of N-terminal residue identification of proteins is

(A) Edman degradation method
(B) Dansyl chloride method
(C) Hoffman degradation method
(D) Phenolization method

175 Parallel β-sheets are …… stable than antiparallel β-sheets

(A) equal
(B) less
(C) more
(D) highly

176 Ω loops are almost invariably located

(A) inside the protein
(B) on the surface of the protein
(C) at the edge of the protein
(D) at the end of the protein

177 Prolyl hydroxylase requires ---------- to maintain its enzymatic activity

(A) vitamin-B12
(B) vitamin-A
(C) vitamin-C
(D) vitamin-B2

178 Rossman fold is

(A) αβαβα
(B) ββαββ
(C) βαββα
(D) βαβαβα

179 Fluoride ion inhibits glycolysis by inhibiting

(A) glucokinase
(B) hexokinase
(C) enolase
(D) phosphoglycerate mutase

180 Rifampicin inhibits transcription of

(A) Eukaryotes
(B) Prokaryotes
(C) Archae
(D) Both eukaryotes and prokaryotes

181 CAAT box is present between

(A) -60 and -100 position
(B) -70 and -90 position
(C) -80 and -110 position
(D) -90 and -120 position

182 Cockayne Syndrome is a ---------- disease

(A) vitamin deficiency
(B) mineral deficiency
(C) genetic defect
(D) protein deficiency

183 The sequence of gene in trp operon is

(A) trpE-trpD-trpC-trpB-trpA
(B) trpA-trpB-trpC-trpD-trpE
(C) trpB-trpA-trpC-trpD-trpE
(D) trpD-trpE-trpA-trpB-trpC

184 The araBAD operon was discovered by

(A) Robert Cock
(B) Robert Schleif
(C) James Watson
(D) Friedrick Sanger

185 Diptheria toxin inhibits eukaryotic

(A) elongation factor eEF2
(B) initiation factor IF-2
(C) initiation factor IF-1
(D) elongation factor eEF-Ts

186 Okazaki fragments are produced during

(A) transcription
(B) translation
(C) DNA replication
(D) transcription termination

187 Okazaki fragments of eukaryotes are of

(A) 100-200 nt
(B) 200-300 nt
(C) 250 – 350 nt
(D) 400 – 500 nt

188 Kallitoxin, a neurotoxin has been isolated from a marine –

(A) actinobacteria
(B) cyanobacteria
(C) red alga
(D) angiosperm

189 Which one of the following biofouling organisms is not listed in IUCN's 100 worst invasive species?

(A) The European shore crab
(B) The Mediterranean mussel
(C) The Asian kelp
(D) The Asian green mussel

190 P. notatum is associated with -

(A) an antifouling agent
(B) a bioactive compound
(C) an antibiotic
(D) an active ingredient

191 Scientist who correctly established that the normal diploid chromosome number in human is 46.

(A) Schleiden and Schwann
(B) Tjio and Levan
(C) Farmer and Moore
(D) Boveri and Sutton

192 Which of the following genes are used for phylogenetic studies of different species?

(A) Paralogous genes
(B) Homologous genes
(C) Orthologous genes
(D) Heteroplasmic genes

193 Chromosome number of daughter cells after mitosis is

(A) Same of parental cells
(B) Half of the parental cells
(C) 2n
(D) 4n

194 A chromosome in which centromere is located quite near the end is called

(A) Submetacentric
(B) Metacentric
(C) Acrocentric
(D) Telocentric

195 Incomplete linkage allows crossing over between linked genes with

(A) Same frequency
(B) High frequency
(C) Very high frequency
(D) No crossing

196 Centimorgan is used as a unit in .

(A) Genetic mapping
(B) Physical mapping
(C) Chromosome mapping
(D) Mapping bacterial genes

197 A nonsense mutation involves

(A) Creation of a stop codon
(B) a regulatory sequence
(C) an AG splice acceptor site
(D) the creation of a different amino acid

198 It is also called as reduction division

(A) Mitosis
(B) Cytokinesis
(C) Meiosis
(D) Karyokinesis

199 It provides selective continuity between nuclear and cytoplasmic materials

(A) Plasma membrane
(B) Nuclear membrane
(C) Cell wall
(D) Plastids

200 If the mutation occurs naturally without the artificial treatment by physical or chemical agents, the mutation is called as

(A) Spontaneous mutation
(B) Reverse mutation
(C) Forward mutation
(D) Local mutation

Q.No	Option		Q.No	Option		Q.No	Option		Q.No	Option
1	D		51	B		101	D		151	C
2	C		52	A		102	A		152	C
3	C		53	B		103	B		153	C
4	D		54	B		104	A		154	A
5	D		55	B		105	B		155	A
6	C		56	A		106	A		156	D
7	A		57	D		107	C		157	D
8	C		58	B		108	A		158	C
9	B		59	A		109	A		159	D
10	A		60	C		110	B		160	B
11	A		61	C		111	B		161	A
12	C		62	D		112	A		162	D
13	D		63	D		113	B		163	A
14	B		64	C		114	C		164	A
15	D		65	B		115	A		165	A
16	B		66	C		116	B		166	B
17	C		67	D		117	B		167	B
18	A		68	B		118	C		168	A
19	C		69	C		119	A		169	B
20	D		70	A		120	A		170	C
21	C		71	C		121	B		171	A
22	A		72	B		122	D		172	D
23	C		73	C		123	A		173	D
24	A		74	C		124	B		174	A
25	C		75	B		125	A		175	B
26	C		76	D		126	A		176	B
27	B		77	B		127	B		177	C
28	C		78	A		128	B		178	D
29	D		79	B		129	C		179	C
30	A		80	A		130	B		180	B
31	B		81	D		131	A		181	B
32	D		82	B		132	C		182	C
33	B		83	B		133	B		183	A
34	B		84	C		134	A		184	B
35	C		85	B		135	B		185	A
36	C		86	B		136	B		186	C
37	C		87	C		137	C		187	A
38	B		88	A		138	B		188	B
39	B		89	B		139	D		189	D
40	C		90	D		140	A		190	C
41	C		91	B		141	C		191	B
42	A		92	B		142	C		192	C
43	B		93	A		143	D		193	B
44	B		94	D		144	A		194	D
45	A		95	A		145	C		195	A
46	A		96	B		146	D		196	A
47	D		97	B		147	D		197	A
48	B		98	B		148	A		198	C
49	D		99	B		149	D		199	B
50	B		100	A		150	B		200	A